

**SIX NEW SPECIES OF *CATASTEGA*  
(LEPIDOPTERA: TORTRICIDAE: EUCOSMINI) FROM  
MEXICO AND SOUTHWESTERN UNITED STATES**

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*Abstract.*—In celebration of the eightieth birthday of Dr. John G. Franclemont, six new species of *Catastega* (Lepidoptera: Olethreutinae: Eucosmini) are described as follows: *C. spectra*, from Texas, *C. nebula*, from Arizona, *C. strigatella*, from New Mexico, Texas, and Mexico, *C. triangulana*, from Arizona and Mexico, *C. adobe*, from Arizona, New Mexico, and Texas, and *C. plicata*, from Arizona and Mexico.

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This paper is dedicated to Dr. John G. Franclemont, because of his direct and indirect contributions in documenting the Lepidoptera fauna of the southwestern United States. Dr. Franclemont, assisted by a number of graduate students, spent a total of 31 months in Arizona during nine extended periods between 1959 and 1974; these field trips were notable for the intense collecting, e.g., 99 nights out of a possible 100 in 1960, and the resulting large number of undescribed taxa that were collected (Franclemont, 1961, 1964, 1976). During these trips to Arizona, Dr. Franclemont collected several species of Olethreutinae in various genera that remain undescribed, and his graduate students collected three of the following six new species of *Catastega* Clemens. Species of *Catastega* from Texas, New Mexico, and Mexico similar to those in Arizona also are treated here.

The North American genus *Catastega* was resurrected from synonymy with *Epinotia* Hübner and characterized by apomorphies of the male anellus and female sterigma by Brown (1986). At present the genus includes two eastern species, *C. timidella* Clemens and *C. aceriella* Clemens, which have larvae forming serpentine frass and silk tubes, and one western species, *C. marmoreana* (Heinrich), for which hosts and larval habits are unknown. The following six new species indicate that morphological diversity in this genus is greatest in the southwestern United States and Mexico.

METHODS AND MATERIAL

A stereomicroscope with an ocular micrometer was used to examine and measure specimens. The forewing length was measured from the outer edge of the tegula at wing base to the outermost edge of the fringe scales at apex. Setae and cornuti were counted by examining their sockets with a compound microscope. The "Methuen Handbook of Colour" (Konerup and Wanscher, 1983) was used as a standard for describing colors of imagos as observed under an incandescent light source.

Descriptions of the forewing are based on a comparative study of pattern elements in more than 600 tortricid species representing all tribes as defined by Horak and Brown (1991). The terminology for pattern elements is based largely on Nijhout



Fig. 1. *Catastega nebula*, n. sp., holotype, forewing with pairs of costal strigulae labeled 1–10.

(1978), as modified and discussed by Brown and Powell (1991). The term umbra is used for narrow, transverse lines of scales in fascial or interfascial areas that contrast with the paler ground color; the term spot is used for contrasting pigmentation that is confined to a restricted portion of a fascia (e.g., pretornal spot) or an interfascial area (e.g., white interfascial spot between subbasal and median fasciae in Figs. 2 and 3). The term patch is used to describe a color field that differs from the ground color and that covers at least one fascia and one interfascial area. The term stria is used for narrow, transverse lines of gray (silver when viewed at an appropriate angle to light) scales that originate at the costal strigulae and extend towards the inner or outer margin. Costal strigulae, which mark the margins of fasciae and usually occur in pairs, are numbered 1 to 10 from base to apex (Fig. 1).

Unidentified Olethreutinae and specimens identified as *Epinotia*, with which *Catastega* has been confused, have been borrowed from 27 institutions and several private collections. Specimens of the following new species of *Catastega* were borrowed from or are deposited in the collections of the following: André Blanchard (AB, deposited in USNM), American Museum of Natural History, New York (AMNH), Cornell University Insect Collection (CUIC), Edward C. Knudson, Houston, TX (ECK), Richard L. Brown, Mississippi State, MS (RLB), University of California, Berkeley (UCB), University of Connecticut, Storrs (UCONN), U.S. National Museum of Natural History (USNM).

KEY TO THE SPECIES OF *CATASTEGA*

1. Forewing with pale yellow ground color, subbasal fascia forming longitudinally elongate spot between middle of discal cell and CuP ..... *plicata*, n. sp.

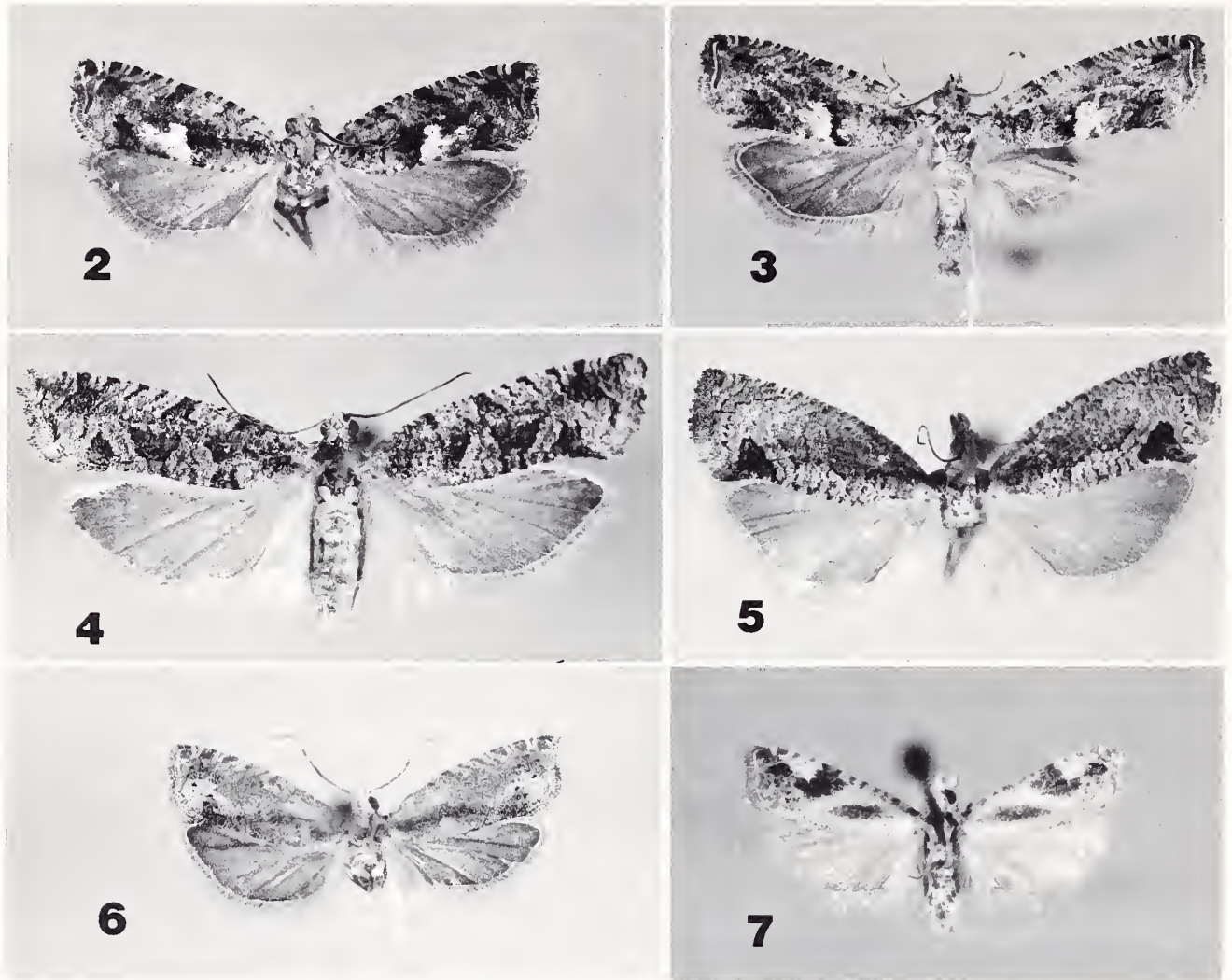


- Forewing ground color grayish brown, brownish gray, or brownish red, subbasal fascia extending to costa or inner margin or not forming contrasting spot . . . . . 2
- 2. Forewing with brownish red ground color, without contrasting fasciae . . . . . *adobe*, n. sp.
- Forewing ground color not brownish red, with or without contrasting fasciae . . . . . 3
- 3. Forewing with termen slanted towards tornus, apex acute, interfascial areas distinctly strigate . . . . . *strigatella*, n. sp.
- Forewing with termen not slanted towards tornus, apex not acute, interfascial areas not distinctly strigate . . . . . 4
- 4. Forewing with brown, triangular, pretornal spot, without other contrasting fasciae . . . . . *triangulana*, n. sp.
- Forewing with or without brown, pretornal spot, with other contrasting fasciae . . . . . 5
- 5. Forewing with subbasal fascia and pretornal spot not distinct on inner margin, pale inner marginal half and dark costal half separated by sinuate border . . . . . *timidella* Clemens
- Forewing with subbasal fascia and pretornal spot distinct on inner margin, inner marginal half not contrastingly paler than costal half nor separated by sinuate border . . . . . 6
- 6. Ocellar area of forewing with well separated silver striae enclosing large group of peppered scales; male costal fold present or absent; occurring west of a line between San Antonio, Texas, and Winnipeg, Manitoba . . . . . 7
- Ocellar area of forewing with approximate silver striae not enclosing large group of peppered scales, male costal fold absent; occurring east of a line between San Antonio, Texas, and Winnipeg, Manitoba . . . . . *aceriella* Clemens
- 7. Forewing with pretornal spot contrastingly darker than median fascia on costa, without white interfascial spot on inner margin, male costal fold present; female sterigma surrounded by sternum VII . . . . . *marmoreana* (Heinrich)
- Forewing with pretornal spot usually not darker than median fascia on costa, with or without white interfascial spot, male costal fold absent; female sterigma posterior to sternum VII . . . . . 8
- 8. Silver stria between pretornal spot and postmedian fascia with irregular distal margin, ocellar area with many white scales; male cucullus rounded ventrally; occurring in Arizona . . . . . *nebula*, n. sp.
- Silver stria between pretornal spot and postmedian fascia with even distal margin, ocellar area with few white scales; male cucullus angled ventrally; occurring in Texas . . . . . *spectra*, n. sp.

***Catastega spectra*, new species**

Figs. 2, 8, 9, 15

*Description.* Head: vertex grayish brown anteriorly, light grayish brown posteriorly, posterior scales with apices white to orange gray; labial palpus light grayish brown, second segment with orange-white or orange-gray scales on ventral base and with concolorous band on dorsal surface near two-thirds length, band becoming diffuse laterally and extending towards apex of ventral scale tuft. Thorax: mesonotum light grayish brown with white-tipped scales, with dark grayish-brown, transverse band at middle and concolorous semicircular band on posterior lobe, semicircular band approximate to transverse band at midline, bands diffuse and less distinct in some specimens; tegula usually dark grayish brown basally, light grayish brown or light grayish orange intermixed with yellowish white apically, most scales with white tips, some specimens with small, brownish orange or grayish orange spot surrounded by dark grayish brown at base. Forewing (Fig. 2): length 7.0–7.7 mm in males, 6.7–7.7 mm in females; male costal fold absent; termen concave, with indistinct white strigula



Figs. 2-7. *Catastega* n. spp. imagos, all photographed at same magnification. 2. *C. spectra*, male Mt. Locke, Texas. 3. *C. nebula*, male, Chiricahua Mts., Arizona. 4. *C. strigatella*, female, Guadalupe Mts., Texas. 5. *C. triangulana*, female, Santa Rita Mts., Arizona. 6. *C. adobe*, holotype, male, Chiricahua Mts., Arizona. 7. *C. plicata*, male, Santa Rita Mts., Arizona.

between  $R_5$  and  $M_1$ ; costa with eight pairs of white to yellowish white strigulae apparent, pairs 1-4, 9, and 10 separate, 5 approximate to 6 and 7 approximate to 8 with each of two pairs appearing as single pair, strigulae separated by dark grayish-brown fasciae and umbrae; ground color light grayish brown, most scales with white to yellowish white tips, some specimens with large, white (as in Fig. 2) or small, brownish orange interfascial spot on inner margin; fasciae incomplete, dark grayish brown, broken transversely to form umbrae or longitudinally to form spots; basal fascia represented by narrow umbrae and isolated, small groups of scales; subbasal fascia represented by narrow, isolated umbra on costa and large, subquadrate spot on inner margin, outer margin of spot slanted toward wing apex, some specimens with subbasal spot confluent with median fascia at midwing; median fascia narrow on costa between strigulae 4 and 5, becoming broader at midwing, broken by ground color or white and one or two, small, transverse, gray (silver) bars at  $CuA_2$  to form triangular pretornal spot, spot enclosing 2-3, small, transverse, gray (silver) bars near inner margin and 2-3, small, longitudinal dark brown bars near midwing, median fascia with scales more peppered with yellow white apices than scales in subbasal



fascia; postmedian fascia narrow on costa between strigulae 6 and 7–8 and extending toward termen, angled towards tornus and widened near  $R_5$  to form spot enclosing 2–3 small groups of dark-brown scales, fascia enclosing small, gray (silver) bar at tornus, scales between  $R_5$  and tornus more peppered with white apices than scales in median fascia, postmedian fascia bordered distally and proximally by wide, gray (silver) striae, proximal stria with distal margin even and not broken by scales of postmedian fascia; grayish brown scales in costal and terminal areas apical to strigulae 7–8 with orange color when viewed at angle to light; outer margin with bases of attenuate fringe scales white to orange white, forming terminal line from apex to midway between  $CuA_1$  and  $CuA_2$ ; fringe between apex and tornus with proximal scales dark grayish brown with white apices, distal scales light brownish gray, without white apices except at terminal strigula between  $R_5$  and  $M_1$ . Underside brown except for yellowish white costal strigulae 3–10, scales in terminal area between strigulae 9 and tornus with white tips. Hindwing: upperside uniformly light brown; underside light grayish brown with distinct ripples of yellowish white on costa and indistinct ripples on terminal area between  $M_1$  and  $CuA_1$ .

Male genitalia (Figs. 8, 9): tegumen moderately broad, densely setose posterolaterally, moderately setose dorsomedially; uncus with forks well separated at their bases, forks sharply bent posteriorly at near midlength, each fork densely setose dorsally from near midlength to below its base; socius subquadrate, dorsoapically rounded, ventroapically fusing with base of gnathos, densely setose laterally from dorsal margin to base of gnathos except for smooth, rimlike, apical margin, vertical length of setose area at apical margin  $0.50\text{--}0.53 \times$  the length of straight line distance from ventral base of tegumen to base of uncus forks; aedeagus with 18 cornuti; anellus cuplike, not closely surrounding aedeagus, dorsal side elongate, length subequal to that of aedeagus, medially cleft; valva with elongate cluster of spiniform setae on sacculus, costa not indented distal to costal hook, dorsal and ventral margins of valva subparallel at middle third, cucullus elongate, apical margin forming obtuse angle with ventral margin of valva (two preparations examined).

Female genitalia (Fig. 15): sternum VII with scales sparse laterally, dense posteromedially, with a few rugae posterolaterally; tergum VIII with sparse setae and scales scattered on lateral extensions, each extension lateral to bases of apophyses with less than 20 scales and setae, dorsum with sparse setae; papillae anales with lateral and medial margins of each ventral surface subparallel, not expanded posteriorly, densely setose, some lateral setae with well-developed, papillose bases, rugae absent; sterigma conical, lamella antevaginalis well developed, without rugae, lamella postvaginalis reduced to narrow rim, posterolateral angles acute, setae absent; ductus bursae encircled by colliculum, moderately long on one side, sinewy, ductus expanded anteriorly before corpus bursae; signa subequal in size or with one signum smaller (three preparations examined).

*Holotype*. Male, labeled "McDonald Obser., Mt. Locke, Tex., 19-VII-1971, A. Blanchard." The type locality at McDonald Observatory is located 6,828 ft above sea level in Jeff Davis Co. The holotype is in excellent condition and is deposited in the U.S. National Museum of Natural History. Of the variation within the species, the holotype has an interfascial area on the inner margin between the subbasal and median fasciae that is light brownish gray, enclosing a small brownish orange spot (as in Fig. 1).

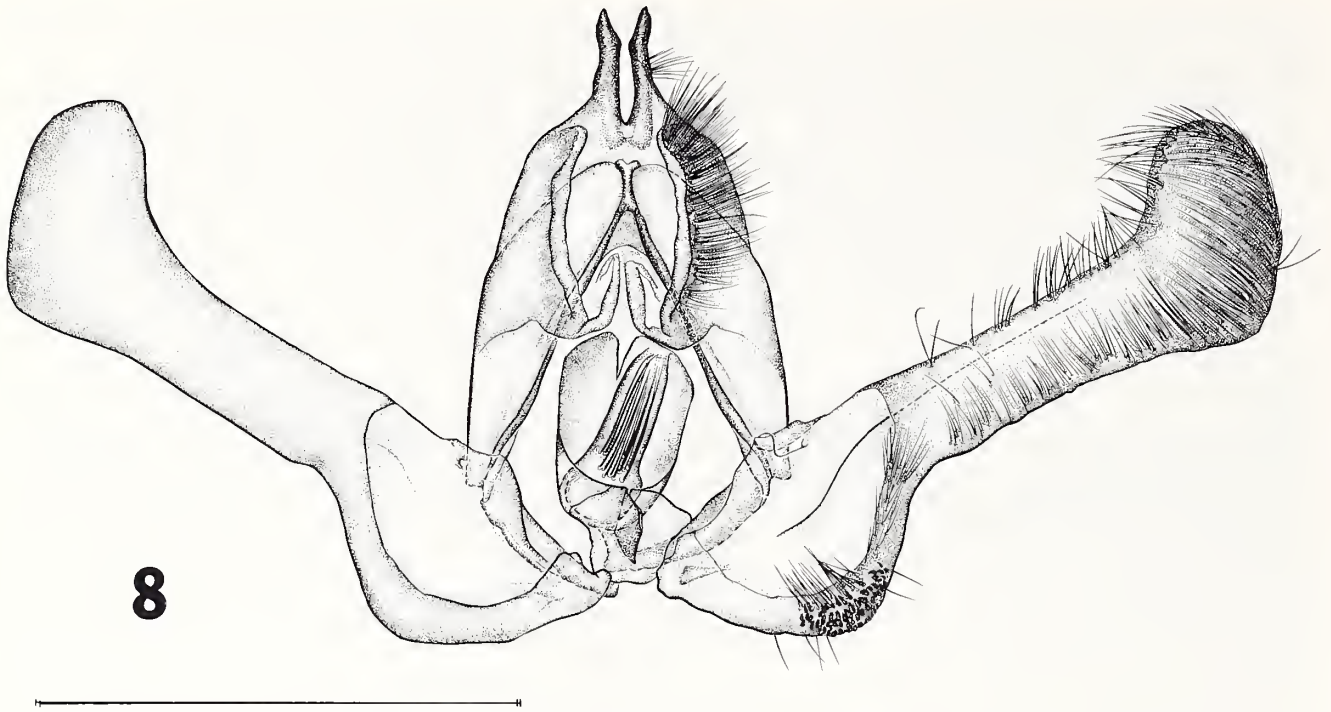


Fig. 8. *Catastega spectra*, n. sp., male genitalia, USNM slide 16026, Mt. Locke, Texas. Scale = 1 mm.

*Paratypes. United States. Texas:* same data as holotype, 11 males, genitalia slides USNM 16026, 17771, 4 females, genitalia slides USNM 17649, 17753, 17754 (RLB, USNM).

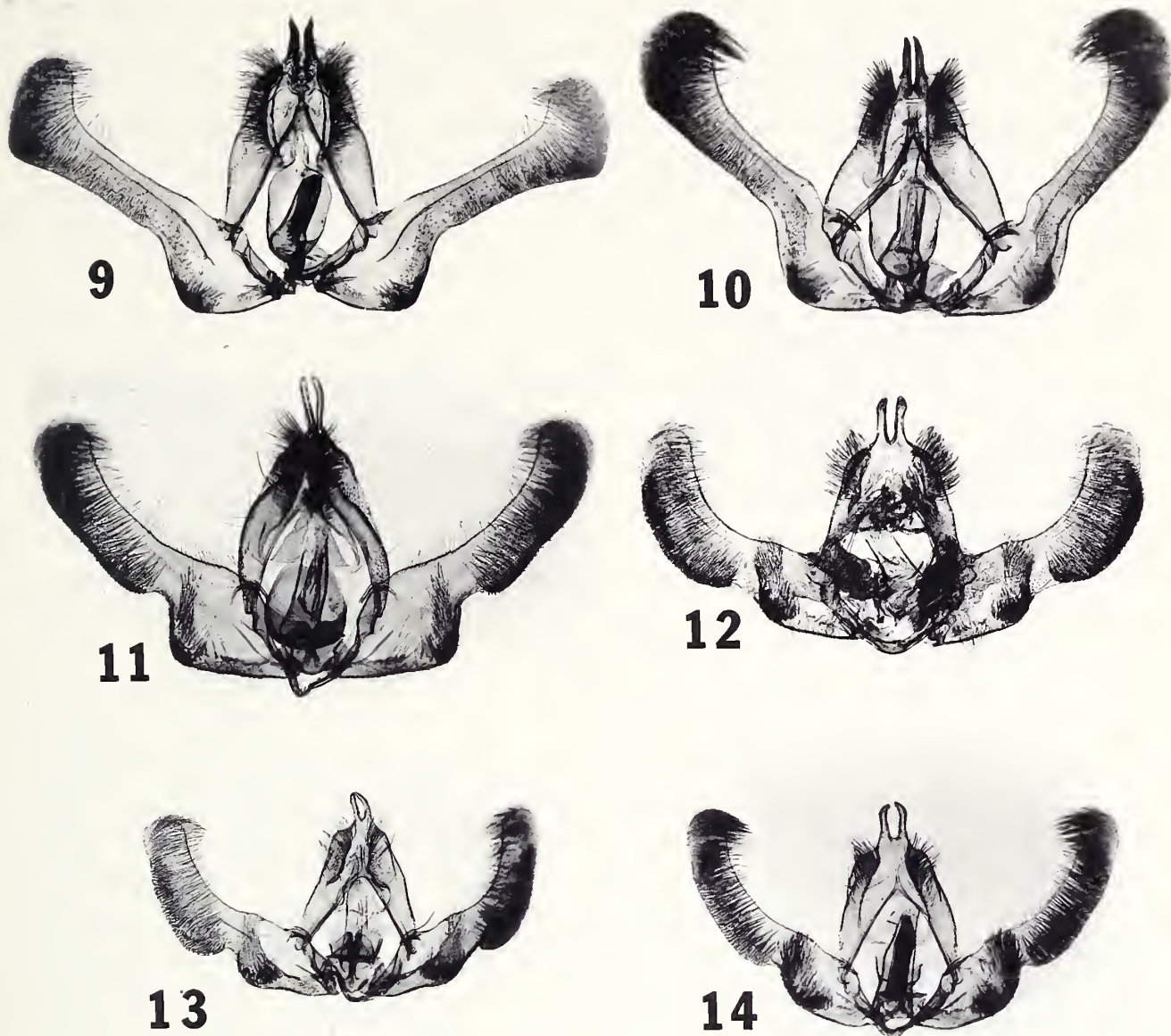
*Diagnosis.* Among previously described *Catastega*, *C. spectra* is most similar in genitalia to *C. aceriella* and *C. timidella*. The new species is superficially distinct by the light brown hindwing, the more contrasting subbasal and median fasciae, and the contrasting lightly pigmented area between these two fasciae on the inner margin. Distinctive characters of male genitalia include an uncus with forks that are well separated at their bases and that are bent posteriorly, an anellus with the dorsal plate subequal in length with the aedeagus, and a valva with the medial third having subparallel dorsal and ventral sides and with the apical margin of the cucullus forming an obtuse angle with the ventral margin. The female genitalia of the three species are similar in form, but the new species differs in having a wider tergum VIII, narrower papillae anales, a longer, smooth lamella antevaginalis that ventrally covers the ostium, and narrower signa. *Catastega spectra* is very similar in forewing pattern and genitalia to a new species from Arizona, which is differentiated in the following description.

#### ***Catastega nebula*, new species**

Figs. 1, 3, 10, 16

*Description.* Head and thorax: as in *C. spectra*. Forewing (Figs. 1, 3): as in *C. spectra* except length 7.7–8.5 mm in males, 7.8–8.6 mm in females; costa with 9 pairs of strigulae apparent, with pairs 5 and 6 separate and distinct; median fascia more narrow and less defined between costa and midwing; postmedian fascia between midwing and tornus with white scales intermixed with brown and dark grayish brown





Figs. 9–14. *Catastega* n. spp., male genitalia, all photographed at same magnification. 9. *C. spectra*, USNM slide 16026. 10. *C. nebula*, USNM slide 17738. 11. *C. strigatella*, AB slide 3765 (in USNM). 12. *C. triangulana*, holotype, USNM slide 28866. 13. *C. adobe*, USNM slide 17778. 14. *C. plicata*, holotype, USNM slide 17769.

scales with white tips, proximal margin of fascia and distal margin of gray stria irregular, with gray stria often broken by white or white-tipped scales of fascia. Hindwing: underside light grayish brown with indistinct ripples of yellowish white on costa and without ripples on terminal area between  $M_1$  and  $CuA_1$ .

Male genitalia (Fig. 10): as in *C. spectra* except uncus with forks curved posteriorly, not strongly bent, dorsum of each fork setose on basal one-fourth; socius with apical margin of lateral surface densely setose, vertical length of setose area at apical margin of socius  $0.37\text{--}0.40 \times$  the length of straight line distance from ventral base of tegumen to base of uncus forks, medial surface with smooth rim on apical margin; aedeagus with 22–30 cornuti; valva with base of costa deeply indented distal to costal hook, cucullus rounded ventrally (five preparations examined).

Female genitalia (Fig. 16): as in *C. spectra* except sternum VII of some specimens

with rugae lateral to midline from anterior to posterior margins; tergum VIII with setae and scales concentrated on posterior margins of lateral extensions, each extension lateral to bases of apophyses with more than 30 scales and setae; papillae anales with each ventral face narrow anteriorly, expanding posteriorly, lateral margin rugose; lamella antevaginalis with longitudinal rugae (three preparations examined).

*Holotype*. Male, labeled "Rustler Park 8500', Chiricahua Mts., Ariz. VII-14-72, at light, J. Powell. male genitalia slide 310 R.L. Brown." The type locality is in Cochise Co., Arizona. The holotype is deposited at University of California, Berkeley.

*Paratypes*. *United States*. *Arizona*: Cochise Co.: same data as holotype, 7 males, genitalia slides JAP 3629, RLB 1768, 3 females, genitalia slide RLB 311; same data except 3 July 1972, 1 male, RLB photo 159 on file, 12 July 1972, 2 females, genitalia slide RLB 621; Cave Creek, 1 mi SW Portal, 24–29 July 1972, J. Powell, 1 male, genitalia slide JAP 3626; Huachuca Mts., Carr Canyon, 5,300 ft, 29 July 1986, D. L. Wagner, 1 female. Santa Cruz Co.: Santa Rita Mts., Madera Canyon, 5,100 ft, Bog Springs Campground, July 10–26 1964, D. R. Davis, 2 males, genitalia slides USNM 17738, 28867; Madera Canyon, 4,880 ft, 25 Jul. 1959, R. W. Hodges, 1 female, genitalia slide RLB 382, 13 Aug. 1959, 1 female, genitalia slide RLB 383 (deposited in CU, RLB, UCB, UCONN, USNM).

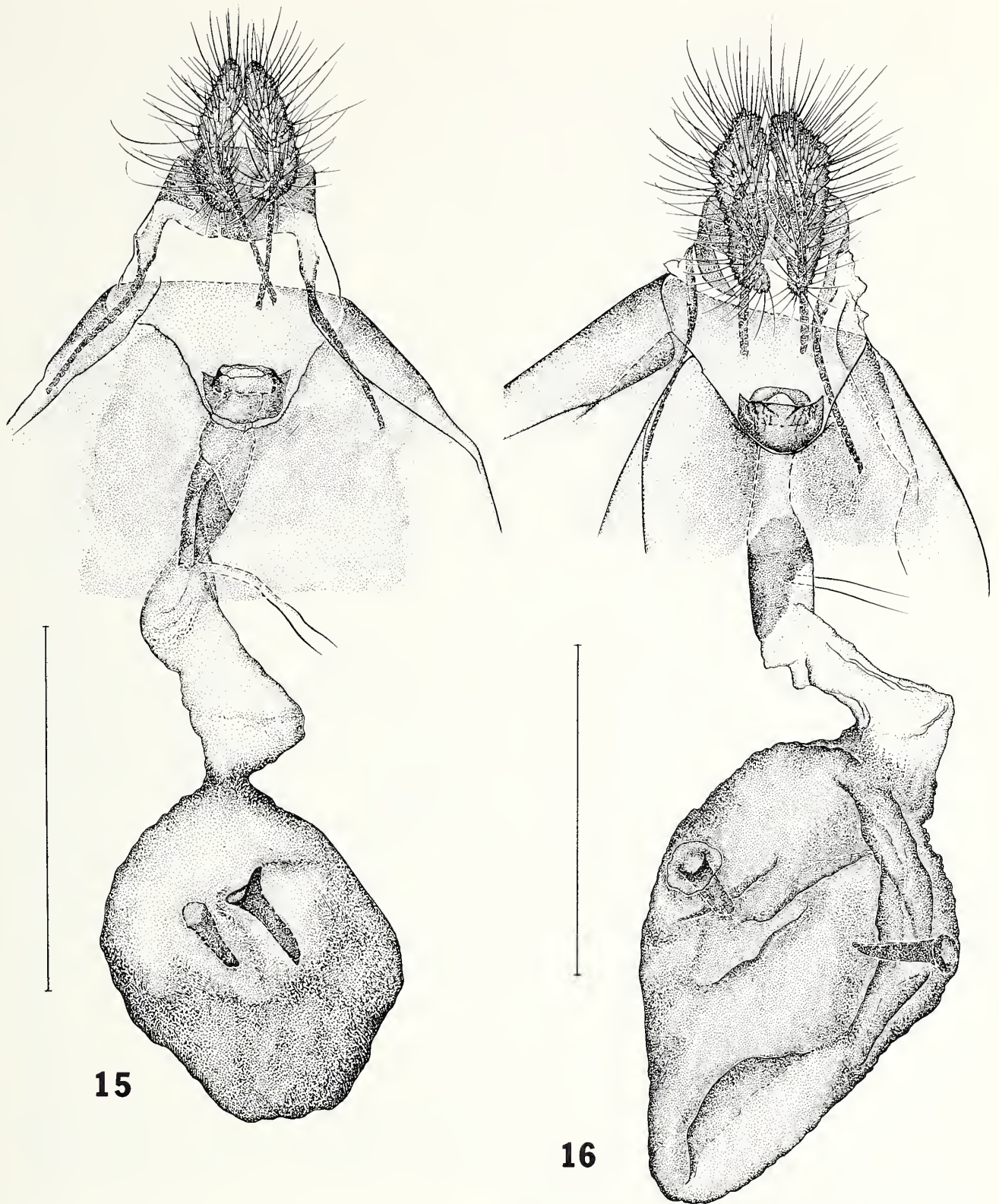
*Diagnosis*. Differences in wing pattern between *C. spectra* and *C. nebula* are subtle but are consistent among specimens examined. The separation of costal strigulae 5 and 6 and the irregular distal margin of the gray (silver) stria between the pretornal spot and postmedian fascia are the most distinctive forewing characters for distinguishing *C. nebula*. The postmedian fascia in *C. nebula* has many white scales in the area of the ocellus, and these are lacking in *C. spectra*; however, the degree of pigmentation of the fasciae is a variable character in some species of *Catastega*. The setation of the apical margin of the lateral surface of the socius, in contrast to a smooth margin in related species, is a result of the socius being apically inflected inwardly, such that the medial surface is also setose apically. In addition, the setose area of the socius is vertically shorter in *C. nebula* than in *C. spectra*, and this is independent of the difference in the size of body, as indicated by forewing lengths.

### *Catastega strigatella*, new species

Figs. 4, 11, 17

*Description*. Head: vertex and labial palpus brownish gray, scales with white to light gray apices. Thorax: mesonotum brownish gray with two, transverse, dark brownish gray bands on posterior half, with area between bands and posterior end light gray to white; tegulae basally dark brownish gray, apically light brownish gray with increasing amount of white to light gray on apices of scales. Forewing (Fig. 4): length 8.2–9.3 mm in males, 8.3–9.7 mm in females; male costal fold present, length of fold  $0.39\text{--}0.41 \times$  forewing length; termen straight, slanted towards tornus to produce acute angle at apex, with light gray strigula between  $R_5$  and  $M_1$ ; costa with nine pairs of light gray strigulae apparent, pairs 1 and 2 separate, poorly expressed, 3 and 4 approximate, appearing as two pairs, 5 and 6 separate, 7 and 8 confluent, appearing as one pair, 9 and 10 separate; ground color light brownish gray, some specimens light gray on costal half of wing, apices of scales varying in amount of light gray; fasciae usually incomplete, dark grayish brown; basal fascia indistinct except for





Figs. 15–16. *Catastega* n. spp., female genitalia. 15. *C. spectra*, USNM slide 17753. 16. *C. nebula*, RLB slide 621 (in UCB). Scale = 1 mm.

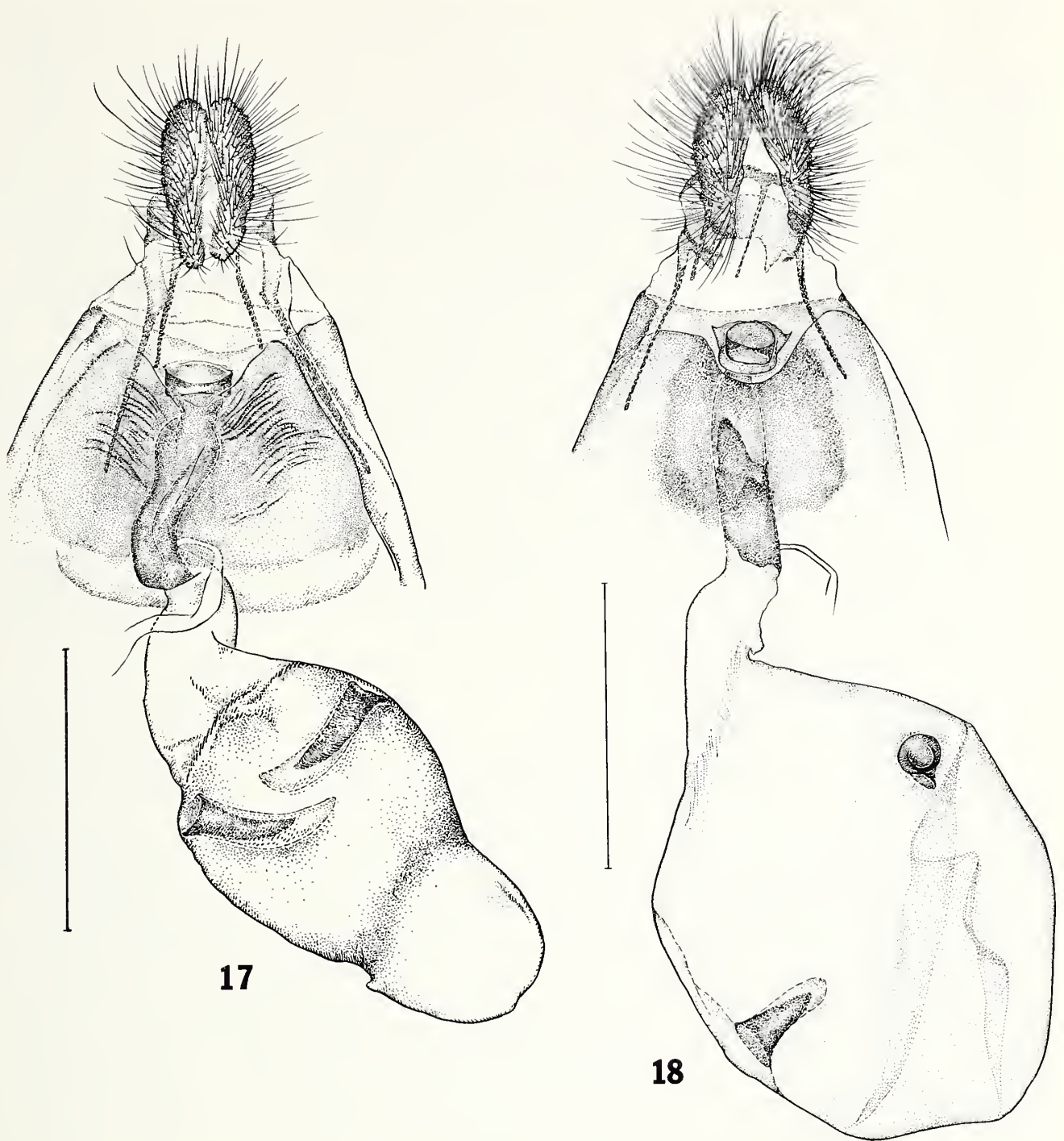
distal margin, extending as umbra from near costa to near inner margin; subbasal fascia complete from costa to inner margin in some specimens, outwardly angled near midwing, usually broken transversely at midwing or near CuP to form contrasting subquadrate spot on inner margin, proximal and distal margins of spot often dark grayish brown and enclosing brownish gray scales with gray apices, proximal

margin of spot extending as umbra from inner margin to CuP, distal margin extending as umbra from inner margin to CuP or midwing, margins of fascia usually distinct from costa to radius; median fascia broken into costal spot extending from costa to radius, medial spot extending from midwing to CuA<sub>2</sub>, and triangular pretornal spot extending from inner margin to CuA<sub>1</sub> when most expressed, proximal and distal margins and central areas of spots concolorous with those of subbasal inner marginal spot, costal spot usually indistinct, often with only margins expressed, medial spot wide at midwing, becoming narrow toward CuA<sub>2</sub>, spot crossed by oblique, dark, brownish gray line, usually with one or two umbrae between CuA<sub>2</sub> and inner margin; postmedial fascia represented by narrow umbra extending from costa to M<sub>3</sub>, often broken near R<sub>3</sub> and appearing connected with interfascial umbrae between strigulae 7 and 8 or with umbra of subterminal fascia between strigulae 8 and 9, ocellus absent, area between M<sub>3</sub> and CuA<sub>2</sub> (area of ocellus in related species) with two, short, approximate, gray striae appearing only slightly silver when viewed at angle to light; subterminal fascia reduced to umbra, broken near M<sub>3</sub>, appearing to originate from small spot between costal strigulae 9 and 10, extending to near CuA<sub>1</sub>, subparallel with postmedial umbra, area between these umbrae and between radius and midwing forming large spot (or patch from elements of postmedial and subterminal fasciae), concolorous with median and subbasal spots; terminal fascia represented at wing apex as small spot concolorous with other spots; outer margin without terminal line; fringe with each scale white to light gray at extreme apex, sharply contrasting with dark brownish gray at subapex, gradually becoming lighter brownish gray to gray from subapex toward base, proximal scales with irregular length and with white apices of scales not forming lines. Underside light grayish brown, costa with strigulae 4–10 distinct. Hindwing: upperside uniformly light grayish brown; underside light brownish gray, costal area with ripples of orange gray.

Male genitalia (Fig. 11): tegumen moderately broad, moderately setose posterolaterally, bare or with sparse setae dorsomedially; uncus with forks asetose, approximate and slender basally, gradually curved posteriorly, base of uncus with group of dense setae below each fork; socius strongly rounded dorsoapically, gently rounded ventrally to base of gnathos, lateral surface with apical third densely setose from dorsal margin to near base of gnathos, medial surface with smooth rim on apical margin; gnathos with base prolonged, arising from ventral one-third of vinculum; aedeagus with more than 31 cornuti; anellus cuplike, not closely surrounding aedeagus, dorsal side elongate, length about two-thirds that of aedeagus, dorsomedial margin concave; caulis short; valvae with small, elongate cluster of spiniform setae on ventroapical margin of sacculus, neck between cucullus and sacculus moderately constricted (four preparations examined).

Female genitalia (Fig. 17): sternum VII moderately setose laterally and anteriorly, densely setose posteromedially, rugose laterally; tergum VIII with apices of lateral extensions moderately scaled (20–25 each side) and sparsely setose (3–5 each side), dorsum sparsely setose; papillae anales with lateral margins evenly rounded, ventral face slightly broadest at one-third distance from posterior end, densely setose, lateral setae with moderately large, papillose bases, rugae absent; sterigma reduced, lamella antevaginalis forming a smooth, narrow rim around ostium, subequal in length with and superimposed on sclerotized posteroventral margin of ostium, lamella postvaginalis absent or reduced to very narrow portion of posterodorsal sclerotized margin





Figs. 17–18. *Catastega* n. spp., female genitalia. 17. *C. strigatella*, RLB slide 902 (in RLB). 18. *C. triangulana*, USNM slide 17688. Scale = 1 mm.

of ostium, setae absent; ductus bursae encircled by long, sinewy colliculum; signa subequal in size (three preparations examined).

*Holotype*. Male, labeled "Brewster Co., Tex., Big Bend Nat. Park, Chisos Basin, 29-III-82, Leg. E.C. Knudson." The specimen is in excellent condition and is deposited in the U.S. National Museum of Natural History.

*Paratypes*. *Mexico. Coahuila*: 17 mi SE Saltillo, 6,800 ft, 23 Sept. 1976, J. A. Chemsak & J. Powell, 1 male, genitalia slide JAP 5013, 1 female. *United States. New Mexico*: Otero Co.: 2 mi NE Cloudcroft, 8,600 ft, 1 Jul. 1964, F., P., & M. Rindge, 1 male. Socorro Co.: 28 mi SW Magdalena, 8,500 ft, 21 Jul. 1964, F., P., & M.

Rindge, 1 female, 22 Jul. 1964, 3 females, genitalia slide RLB 903. *Texas*: Brewster Co.: same data as holotype, 3 males, genitalia slides RLB 1147, ECK 287, 6 females, genitalia slide RLB 1148; Big Bend Nat. Park, Green Gulch, 31 Mar. 1970, A.&M.E. Blanchard, 1 male, genitalia slide AB 3765, 1 female, genitalia slide RLB 902, 3 Apr. 1984, E. C. Knudson, 1 male, 5,400', 2–4 Apr. 1986, E. C. Knudson, 1 male. Culberson Co.: Guadalupe Mts., McKittrick Canyon, 5,000 ft, 23 May 1973, R. W. Hodges, 1 male, genitalia slide USNM 17654; Guadalupe Mts, Smith Canyon, 22 May 1973, A.&M.E. Blanchard, 1 female, RLB photo 51 on file; Guadalupe Mts. N.P., Frijole, 29–31 Mar. 1990, E. C. Knudson, 1 male, same data except Ship on the Desert, 1 male, 1 female. Jeff Davis Co.: Davis Mts. St. Pk., 5 Jun. 1986, E. C. Knudson, 1 female (deposited in AMNH, ECK, RLB, UCB, USNM).

*Diagnosis.* The strigate interfascial areas, fascial pattern, and the slanting termen of the forewing differentiate this species from other *Catastega*. This species also differs from others in having a dark longitudinal line crossing the medial spot of the median fascia and a subterminal umbra that is broken from its origin between strigulae 7 and 8 and is reconnected with the interfascial umbra originating from between strigulae 9 and 10. The male genitalia are unique in having a socius that is ventrally lengthened and tapered into the long base of the gnathos. The valva has a well-defined neck separating the cucullus from the sacculus, similar to *C. marmoreana* and the following three new species.

### *Catastega triangulana*, new species

Figs. 5, 12, 18

*Description.* Head: vertex and labial palpus light grayish brown, posterior scales of vertex with light gray apices. Thorax: mesonotum grayish brown to light brown, scales with light gray apices, light gray increasing posteriorly; tegulae light brown, some specimens with apices of posterior scales light gray. Forewing (Fig. 5): length 6.7–7.3 mm in males, 7.3–7.9 mm in females; male costal fold present, length of fold  $0.38\text{--}0.41 \times$  forewing length; termen straight, not slanted toward tornus, without distinct strigulae, some specimens with lighter fringe scales between apex and  $R_5$ , between  $R_5$  and  $M_1$ , and on each side of  $CuA_2$ ; costa with five pairs of light brownish gray strigulae apparent, strigulae less distinct in some specimens, pairs 5 and 6 separate, 7 and 8 confluent, appearing as one pair, 9 and 10 separate; ground color brownish gray, specimens varying in number of scales with light-gray apices; fasciae as in *C. strigatella* except only pretornal triangle on inner margin well expressed, brown with dark brown margins or uniformly dark brown; costal two thirds from wing base to outer margin of median fascia forming indistinct grayish brown patch, slightly darker than ground color; subbasal fascia expressed as two dark brown umbrae from  $CuP$  to inner margin; postmedian fascia represented by dark brown umbra extending from between costal strigulae 6 and 7 to tornus, dentate and broken in area of ocellus between two, short gray (silver) striae; subterminal fascia extending from between costal strigulae 8 and 9 to near  $CuA_1$ , subparallel with postmedian umbra, some specimens with subterminal and postmedian umbrae connected by short, longitudinal line near  $M_2$ ; terminal fascia indistinct. Underside grayish brown, costa with strigulae 5–10 distinct in some specimens. Hindwing: upperside uniformly



light grayish brown; underside light brownish gray, some specimens with costa orange gray, without ripples.

Male genitalia (Fig. 12): as in *C. strigatella* except uncus with forks less slender basally, setose to midlength; socius strongly rounded dorsoapically and ventroapically, apical margin concave; gnathos arising from ventral base of socius at middle third of tegumen; aedeagus with approximately 20 cornuti; valva with sacculus gently rounded apically, neck and cucullus broad (two preparations examined).

Female genitalia (Fig. 18): as in *C. strigatella* except sternum with rugae very fine, becoming stronger anteriorly; tergum VIII with lateral extensions reduced to narrow bars, densely scaled and sparsely setose, dorsum without setae, anterior margin with two triangular extensions; sterigma less reduced, lamella antevaginalis forming a smooth, moderately broad rim around ostium, longer than sclerotized posteroventral margin of ostium, lamella postvaginalis moderately long, posterolateral angles with or without single seta; colliculum of ductus bursae long, not sinewy (two preparations examined).

*Holotype*. Male, labeled "4 mi ESE Pine, Gila Co. Ariz. 5400 ft, 1 September 1961, Ronald W. Hodges. Genitalia slide by R.L. Brown, USNM 28866." The holotype, which is missing the left mesothoracic leg, is deposited in the U.S. National Museum of Natural History.

*Paratypes*. *United States*. *Arizona*: Cochise Co.: Huachuca Mtns., Ash Canyon, 27–31 Jul. 1986, D. L. Wagner, 1 male; 2 mi SW Portal, 2–5 Aug. 1974, J. Powell, 1 male, genitalia slide RLB 1324. Gila Co.: same data as holotype, 1 female, genitalia slide USNM 17688. Pima Co.: Santa Rita Mtns., Madera Canyon, 4,400 ft, 10 Oct. 1959, R. W. Hodges, 1 female, genitalia slide RLB 297. Santa Cruz Co.: Santa Rita Mtns., Madera Canyon, 4,880 ft, 30 Jul. 1959, R. W. Hodges, 1 female, 5,600 ft, 17 Oct. 1959, 1 female (deposited in CU, RLB, UCB, UCONN, USNM).

*Other material examined*. The following specimens are tentatively identified as *C. triangulana* because of their similar forewing pattern and male genitalia: *Mexico*. *Durango*: 28 mi E El Salto, 8,000 ft, 22 Jul. 1964, [beating] *Arctostaphylos* sp., J. Powell, 3 males, same data except J. A. Chemsak & J. Powell, black & white lights, 8 males, genitalia slides JAP 1787, RLB 1423; 30 mi W Durango, 8,500 ft, 31 Jul. 1964, J. Powell, 2 males, 8,400 ft, 3–7 Aug. 1972, D. Veirs, J. Powell, C. D. MacNeill, 2 males, 1 female, 3–8 Aug. 1972, J. Powell & D. Viers, 1 male, 8,400 ft, Tepalcates, 4–8 Aug. 1972, 1 male, genitalia slide RLB 1334; 9 mi E La Ciudad, 9,000 ft, 23 Jul. 1964, J. Powell, 1 male. *Oaxaca*: 7 mi SE Nochixtlan, 7,000 ft, 7 Oct. 1975, J. Powell & J. Chemsak, 1 male.

These specimens (deposited in UCB) are not included in the type series nor in the description because they represent either a wide range of variation in *C. triangulana* or a distinct species. Unfortunately, both series are small, and the series from Mexico does not include females. The specimens from Mexico are larger, having a male forewing length of 7.8–9.2 mm, and the forewings appear slightly darker than specimens from Arizona. The forewing pattern of specimens from Mexico differs in having a more sinuate line of separation between the costal patch, extending from wing base to median fascia, and the lighter inner margin. This pattern difference, which falls within the range of variation of some *Catastega* species, is a result of the subbasal and median fasciae extending closer to the inner margin in specimens from Mexico than in those from Arizona. Male genitalia of specimens from Mexico, based on

examination of three slide preparations, differ in having a slightly more narrow, elongate, and apically constricted cucullus than those from Arizona; however, these may be allometric differences.

*Diagnosis.* This species and the following new species, *C. adobe*, both have the triangular pretornal spot as the most contrasting fascial element of the forewing pattern, which is unique among North American *Catastega*. The color and pattern of *C. triangulana*, however, is most similar to that of the *C. strigatella*. *Catastega triangulana* differs in its lack of expression of strigulae and fasciae and in having a suffusion of pigment in the interfascial areas between the basal, subbasal, and median fasciae; both subbasal and median fasciae are broken near the same vein in both species but are more expressed on the inner margin in *C. strigatella*. The male and female genitalia of *C. triangulana* are most similar to those of *C. adobe*; males of the two species differ slightly in shape of the valvae, and females differ in development of the sterigma, being more reduced in the latter species.

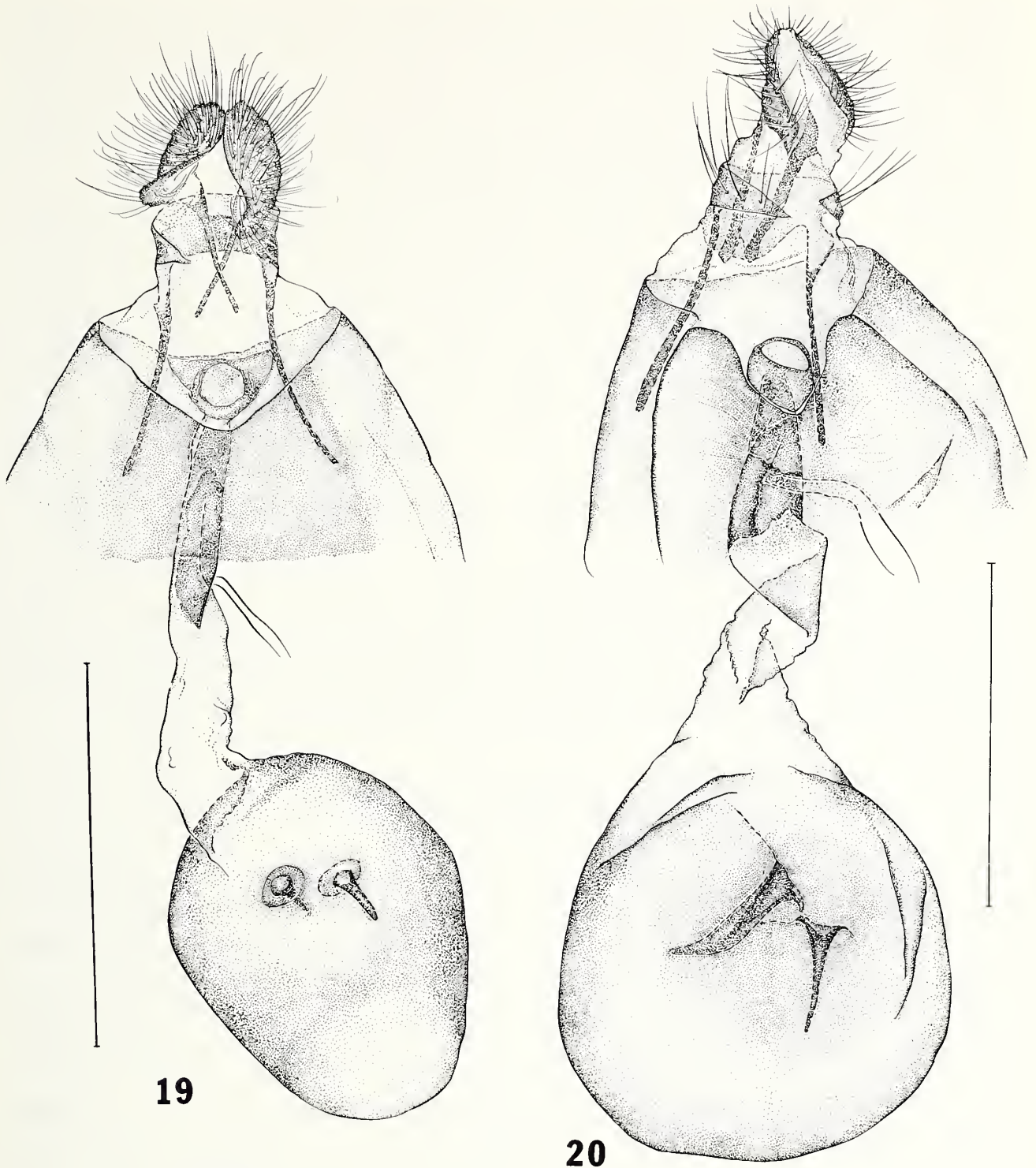
### ***Catastega adobe*, new species**

Figs. 6, 13, 19

*Description.* Head: vertex and frons yellowish white, becoming yellowish gray posterolaterally; labial palpus yellowish white with light brownish-gray band near apex of second segment. Thorax: mesonotum yellowish red anteriorly with tips of scales yellowish white, becoming brownish red posteriorly; tegulae brownish red. Forewing (Fig. 6): length 5.7–6.5 mm in males, 6.3–6.9 mm in females; male costal fold present, length of fold  $0.33\text{--}0.35 \times$  forewing length; termen slightly concave, strigulae absent; costa with five pairs of orange white strigulae apparent, strigulae 5, 6, 9, and 10 separate, strigulae 7 and 8 confluent, appearing as single pair; ground color brownish red; fasciae absent except for pretornal spot; outer two-thirds peppered by variable number of brown and grayish brown scales with white tips, some specimens more peppered with brown scales on median fold, pretornal area, area between ocellus and  $R_4$ , and wing margins; pretornal spot brownish red suffused with variable number of peppered brown scales; ocellus weakly expressed, orange white, bordered by gray (silver) striae proximally and distally; outer margin with orange white terminal line formed from apices of distal row of disc scales and bases of attenuate fringe scales; fringe scales between apex and tornus with white apices, appearing peppered, proximal fringe brown, distal fringe grayish brown. Underside brown except for orange white costa and strigulae. Hindwing: light brown dorsally, light brown to grayish brown ventrally.

Male genitalia (Fig. 13): tegumen narrow ventrally, becoming moderately wide dorsally, sparsely setose laterally, bare dorsomedially; uncus moderately setose from base to midlength of forks; socius sub-triangular, expanded and bulbous dorsobasally, apical margin relatively straight from base of uncus to projecting ventral angle, irregularly serrate at high magnification, lateroapical half and medioapical third setose; gnathos arising from ventral bases of socii, well sclerotized basally; aedeagus with 10–18 cornuti; anellus not closely surrounding aedeagus, forming moderately shallow cup with long dorsal side, length less than half that of aedeagus; valva with sacculus and cucullus separated by neck without setae, sacculus with elongate, poorly





Figs. 19–20. *Catastega* n. spp., female genitalia. 19. *C. adobe*, USNM slide 17658. 20. *C. plicata*, USNM slide 17739. Scale = 1 mm.

defined cluster of spiniform setae on ventral margin, ventroapical corner strongly rounded, not overlapping base of neck (three preparations examined).

Female genitalia (Fig. 19): sternum VII with moderately dense scales throughout, more dense posteromedially, slightly rugose anteriorly; tergum VIII with lateral extensions reduced to narrow triangles, apices of lateral extensions setose and scaled, bare dorsally, anterior margin with two, short triangular projections; papillae anales densely setose, setae with small, papillose bases, rugae absent; sterigma with cone reduced, lamella antevaginalis narrow, lamella postvaginalis with 0–2 setae poster-

olaterally; colliculum of ductus bursae moderately sclerotized, long on one side, not encircling ductus; signa subequal in size and shape (three preparations examined).

*Holotype*. Male, labeled "Ariz. Cochise Co., Portal, 4 mi. W., 5300'; Chiricahua Mts., Aug. 3-6, 1964, D.R. Davis. Genitalia slide by R.L. Brown, USNM 17639. Photograph on file, 135 R.L. Brown." The holotype is in excellent condition and is deposited in the U.S. National Museum of Natural History.

*Paratypes*. *United States*. *Arizona*: Cochise Co.: same data as holotype, 3 males, genitalia slides USNM 17770, 17778, 1 female, genitalia slide USNM 17658. *New Mexico*: Lincoln Co.: Capitan Mts., near Nogal, 1 Aug. 1989, Wagner & Epstein, 1 male, 1 female. McKinley Co.: Ft. Wingate, Jul. 16-23 [year and collector unknown], 1 female, July 24-31, 1 female. Socorro Co.: 28 mi SW Magdalena, Bear Trap Camp, 6,500', July 6 1965, F., P. & M. Rindge, 1 female, July 7 1965, 1 male. *Texas*: Culberson Co.: Guadalupe Mts. N. P., McKittrick Canyon, 30-31 July 1989, Wagner, Epstein, & Knudson, 1 male, Dog Canyon, 6,400', 19-20 Aug. 1990, E. C. Knudson, 4 females; Sierra Diablo W.M.A., 27 Jun. 1981, E. C. Knudson, 1 male. Jeff Davis Co.: Mt. Locke, 27 May 1979, E.C. Knudson, 1 male (deposited in AMNH, ECK, RLB, UCONN, USNM).

*Diagnosis*. *Catastega adobe* differs from other *Catastega* and most other *Olethreutinae* in having brownish red forewings without contrasting fasciae (except for the triangular pretornal spot, which is derived from median fascia). The form of the socius in the male and the form of sterigma with reduced lamella antevaginalis and developed lamella postvaginalis in the female is diagnostic for this species.

### ***Catastega plicata*, new species**

Figs. 7, 14, 20

*Description*. Head: vertex pale yellow to yellowish white; labial palpus yellowish white, intermixed with grayish brown except ventrobasally and at two-thirds length. Thorax: mesonotum yellowish white to pale yellow anteriorly, becoming pale orange to grayish orange posteriorly; tegulae pale orange intermixed with grayish orange basally, becoming yellowish white apically. Forewing (Fig. 7): length 5.8-7.6 mm in males (5.8-6.8 mm in Arizona specimens; 6.0-7.6 mm in Mexico specimens), 5.8-8.3 mm in females (5.8-7.0 mm in Arizona specimens; 6.7-8.3 mm in Mexico specimens); male costal fold present, length of fold 0.56-0.62 × forewing length; termen slightly concave, strigulae absent; costa in female with six pairs of yellowish white to orange white strigulae apparent, pairs 3, 4, 9 and 10 separate, pairs 5 and 6 and pairs 7 and 8 confluent, each confluent pair appearing as single pair, males as in females except with pairs 1-4 yellowish gray, with individual strigulae widely spaced on costal fold, strigulae 5-8 in both sexes with striae concolorous with ground color, indistinct except shiny when viewed at angle to light, strigulae 9 with stria gray (silver) from R<sub>4</sub> to R<sub>5</sub>, strigulae 10 with short gray (silver) stria extending to R<sub>5</sub> or near termen; ground color pale yellow intermixed with variable amounts of yellowish white and pale orange, suffused with reddish orange to brownish orange on costal area between median fascia and apex and terminal area between apex and tornus; fasciae brown intermixed with variable amounts of dark brown and grayish orange; basal fascia absent; subbasal fascia forming longitudinally elongate spot between middle of discal cell and CuP, some specimens with fascia expressed between



costa and radius and/or with suffusion of grayish orange between CuP and inner margin; median fascia brown or brown intermixed with grayish orange, usually extending from costa to between CuA<sub>1</sub> and CuA<sub>2</sub>, rarely complete, some specimens with separate, sub-triangular pretornal spot, some specimens with dark brown, longitudinal streak on accessory cell, inner margin of fascia extending basally near costa beyond apices of strigulae 4; postmedian fascia expressed as large, rounded spot, dark brown intermixed with varying amounts of brown and/or grayish orange, separated from median fascia by ground color or suffusion of grayish orange; subterminal and terminal fascia not expressed; outer margin bordered by white to yellow white terminal line formed from bases of proximal attenuate fringe scales, pre-apical area of proximal fringe scales forming reddish orange line from apex to tornus, becoming more irregular towards latter, distal fringe scales uniformly grayish orange. Underside light grayish brown to grayish orange, costal area rippled by yellowish white to orange white strigulae. Hindwing: upperside yellowish gray to yellowish white, underside yellowish white.

Male genitalia (Fig. 14): tegumen narrow ventrally, becoming expanded at bases of socii, moderately setose laterally, sparsely setose dorsomedially; uncus setose from base to one-third length of forks, apices of forks curved medially; socius dorsobasally expanded, bulbous, apical margin gently rounded dorsoapically and tapered ventrally into bases of gnathos, irregularly serrate at high magnification, lateroapical half and medioapical third setose; gnathos arising from base of ventral socius; aedeagus with 28–32 cornuti; anellus appearing relatively reduced, sclerotized portion forming shallow cup, not closely surrounding aedeagus, dorsal and ventral sides of sclerotized portion subequal in length, dorsal side with lightly sclerotized extension reaching to two-thirds length of aedeagus; valva with sacculus and cucullus separated by neck without setae, sacculus with poorly defined cluster of spiniform setae on ventral margin, ventroapical corner strongly rounded, slightly overlapping base of neck (four preparations examined).

Female genitalia (Fig. 20): sternum VII with moderately dense scales throughout, more dense posteromedially, rugose medially, except for midline, from posterior to anterior margins; ovipositor (segment VIII and posteriorly) modified for insertion; tergum VIII with setae much longer than setae on papillae anales, sparse and random on well developed, triangular, lateral extensions, moderately dense in irregular row on dorsum, scales absent, anterior margin with long, rounded projection; papillae anales fused and attenuate posteriorly, setae moderately dense, bases not on papillae, setose surface wide laterally, narrow ventrally; posterior and anterior apophyses thick and wide with expanded bases; sterigma skewed, lamella antevaginalis well developed, smooth, lamella postvaginalis reduced to narrow rim, without posterolateral angles and setae; colliculum of ductus bursae moderately sclerotized, sinewy, long on one side; signa subequal in size and shape (four preparations examined).

*Holotype*. Female, labeled “*Ariz.* Santa Cruz Co., Madera Canyon 5100’, Santa Rita Mts., July 10–26, 1964, D.R. Davis; Bog Spring Camp Ground; Genitalia Slide by R.L. Brown USNM 17769.” The holotype is in excellent condition, except for missing the right prothoracic leg, and is deposited in the U.S. National Museum of Natural History.

*Paratypes*. *Mexico*. *Durango*: 3 mi E Revolcaderos, 11 Aug. 1972, J. Powell, 1 male; Durango, Arroyo los Mimbres, 2,200 m, 19 Aug. 1984, E. Welling, 1 male, 3

females; 10 mi W El Salto, 8,800 ft, 23 Jul. 1964, J. A. Chemsak & J. Powell, 1 female; 31 mi E El Salto, 18 Jul. 1964, J. A. Chemsak, 1 female, genitalia slide RLB 1413; 30 mi W Durango, 5 Aug. 1972, J. Powell, 1 male, 8,500 ft, 31 Jul. 1964, J. A. Chemsak & J. Powell, 1 male, 2 females, 8,400 ft, 3–8 Aug. 1972, J. Powell, D. Veirs, & C. D. MacNeill, 25 males, genitalia slide JAP 3734, 7 females, Tepalcates, 8,400 ft, 4–8 Jul. 1972, 6 males, genitalia slide RLB 1412, 1 female, same data without elevation, 11 Aug. 1986, Brown & Powell, 2 males, 2 females. *Sinaloa*: 8 mi W El Palmito 6,400 ft, 8–12 Aug. 1972, J. Powell, D. Veirs, & C. D. MacNeill, 1 male, 2 females, 6 Aug. 1986, J. Brown & J. Powell, 1 male. *United States. Arizona*: Cochise Co.: Huachuca Mts., Ash Canyon, 27–31 Jul. 1986, D. L. Wagner, 1 male, Carr Canyon, 5,300 ft, 29 Jul. 1986, D. L. Wagner or Wagner and Powell, 4 females. Pima Co.: Madera Canyon, Bog Springs, 30 Jul. 1973, J. Powell, 1 male. Santa Cruz Co.: same data as holotype, 1 male, 2 females, genitalia slide USNM 17739, same data plus “from flowers *Yucca schottii*,” 1 male; Madera Canyon, 4,880 ft, 19 Jul. 1959, R. W. Hodges, 1 male, genitalia slide RLB 328, 25 Jul. 1959, 1 female, genitalia slide RLB 327, 5,600 ft, 1 Aug. 1959, 1 female, genitalia slide RLB 494, 4,880 ft, 2 Aug. 1959, 1 male, 4 Aug. 1959, 2 males, 1 female, 4,880 ft, 18 Aug. 1959, 1 male (deposited in CU, RLB, UCB, UCONN, USNM).

*Diagnosis.* The pale yellowish color combined with the forewing pattern of the subbasal and medial fasciae and postmedian spot in this species is unique among known North American Eucosmini. The length of the male costal fold in *C. plicata* and *C. marmoreana* is more than half the forewing length, whereas the costal fold is absent or much shorter in other *Catastega* species. Male genitalia differ from those of other known species by the combined forms of the socius and valva; female genitalia differ from other known species by the combined forms of the ovipositor and sterigma. The form of any one structure is similar to that in one or more other species of *Catastega*.

*Comments.* The female of *C. plicata* is considered to have a form of ovipositor for inserting eggs in crevices because of developed setae and loss of scales on the eighth tergum, reduced ventral faces of the papillae anales, and developed apophyses, which are characteristic of other species known to insert eggs in buds, bark crevices, and other constricted areas. In contrast to many species with inserting ovipositors, the ovipositor is not greatly lengthened and the moths fly during late summer, rather than early spring. The ovipositor of *C. plicata* is similar to that of an undescribed species of *Catastega* that occurs in southeastern United States; the latter species has a forewing pattern and male genitalia very similar to *C. timidella*. Although a single male has been collected from flowers of *Yucca*, the host remains unknown.

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I thank Dr. John G. Franclemont for his guidance during the period when I first began gleaning new species of *Catastega* from among unidentified Olethreutinae. I gratefully acknowledge Frederick H. Rindge (AMNH), L. L. Pechuman (CUIC), Edward C. Knudson, Jerry A. Powell (UCB), David L. Wagner (UCONN), Don R. Davis (USNM), and the late Andre Blanchard for the loan of specimens. Photographs of the imagos, except Figure 1, were made by Howard Lyons; drawings were made by Amy Trabka, and plates were made by Joe MacGown.



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